

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of

Application of RigNet Satcom, Inc. for a	)	
License to Operate a Fixed Earth Station	)	
Terminal in the 27.6-28.4 GHz (Earth-to-	)	File No:
space), 28.6-29.1 (Earth-to-space), 17.8-18.6	)	
GHz (space-to-Earth) and 18.8-19.3 GHz	)	Call Sign:
(space-to-Earth) Frequency Bands	)	
	)	
	)	

**Earth Station License Application**

By this application, RigNet Satcom, Inc. (“RigNet”) respectfully seeks an earth station license to operate a 2.2m Ka-band earth station terminal – the Orbit Model AL-7107-Ka OrBand VSAT system (“Orbit-2.2”) – on the Shenzi Platform, a stationary oil and gas rig located at 27° 18’ 02.16” N, 90° 08’ 06.00” W in the Gulf of Mexico, with O3b Limited’s (“O3b”) Ka-band non-geostationary satellite orbit (“NGSO”) fixed-satellite service (“FSS”) system. RigNet seeks authority to operate the terminal in the 27.6-28.4 GHz (Earth-to-space), 28.6-29.1 GHz (Earth-to-space), 17.8-18.6 GHz (space-to-Earth) and 18.8-19.3 GHz (space-to-Earth) band segments of the Ka-band, which previously have been authorized for earth terminal communications with the O3b system.

Granting authority to operate the Orbit-2.2 terminal in the Ka-band will serve the public interest by allowing RigNet to provide vital satellite-based broadband communications services to the oil platform, where reliable remote broadband connectivity is critical for operational, safety and other reasons.<sup>1</sup> In addition, not only has the Commission already authorized the Orbit-2.2 terminal to operate in the maritime

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<sup>1</sup> The proposed Orbit-2.2 terminal operations on the Shenzi Platform are scheduled to commence on or about March 1, 2016, which should afford sufficient time for consideration and grant of this application. To the extent that the commencement of operations date changes or application processing considerations delay the Commission’s review, RigNet may file a special temporary authorization (“STA”) request to ensure timely commencement of planned operations.

context, but RigNet has fully coordinated the proposed operations at the subject site so there is no potential for interference from the proposed operations.

## **I. BACKGROUND**

RigNet seeks to operate the Orbit-2.2 terminal in certain Ka-band frequencies on a fixed oil platform while communicating with the O3b system. In 2015, the Commission granted O3b's Petition for Declaratory Ruling seeking market access to serve the United States.<sup>2</sup> In that application, O3b submitted a Schedule S describing the technical characteristics of its satellite system. RigNet certifies that it will operate the Orbit-2.2 terminal with the O3b system consistent with the technical parameters outlined in the O3b application for market access.

The Orbit-2.2 terminal has been the subject of numerous blanket license and waiver applications by O3b, where the Commission has authorized Ka-band operations of the terminal on maritime vessels and at fixed locations. In May 2014, the Commission granted O3b a blanket earth station onboard vessel ("ESV") license and a related waiver to operate one hundred Orbit-2.2m terminals on U.S. and non-U.S. registered vessels in NGSO primary Ka-band spectrum, the 28.6-29.1 GHz (Earth-to-space) band and the 18.8-19.3 GHz (space-to-Earth) band.<sup>3</sup> In September 2014, the Commission granted authority to O3b to operate the Orbit-2.2m on up to three non-U.S. registered vessels in and near U.S. waters in the GSO primary Ka-band spectrum, the 28.35-28.4 GHz (Earth-to-space) band and 18.3-18.6 GHz (space-to-Earth) band.<sup>4</sup>

The following year in May 2015, the Commission granted O3b maritime operating authority to use Orbit-2.2 terminals on six non-U.S. registered maritime vessels in and near U.S. waters in the local multipoint distribution service ("LMDS") primary

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<sup>2</sup> See File No. SAT-LOI-20141029-00118, Call Sign S2935 (granted Jan. 22, 2015).

<sup>3</sup> See File No. SES-LIC-20130528-00455 (Call Sign E130098); Letter from Jose Albuquerque, Chief, Satellite Division and Mark Settle, Chief, Policy and Rules Division, to Joslyn Read, O3b Limited, DA 14-637 (rel. May 13, 2014).

<sup>4</sup> See File No. SES-MS-20140318-00150, Letter from Jose Albuquerque, Chief, Satellite Division and Mark Settle, Chief, Policy and Rules Division, to Suzanne Malloy, O3b Limited, DA 14-1369 (rel. September 22, 2014).

uplink band, the 27.6-28.35 GHz (Earth-to-space), and the Fixed Service (“FS”) primary downlink band, 17.8-18.3 GHz (space-to-Earth).<sup>5</sup> Most recently in June 2015, O3b was issued a blanket ESV license to operate 1,000 fixed Orbit-2.2 terminals in NGSO primary Ka-band spectrum, the 28.6-29.1 GHz (Earth-to-space) band and the 18.8-19.3 GHz (space-to-Earth) band.<sup>6</sup>

As demonstrated above, there is extensive precedent for the Commission to license the Orbit-2.2 terminal to operate on a fixed oil rig platform in the Gulf of Mexico. RigNet’s proposed operation of a single Orbit-2.2 terminal in a fixed oil rig is much more limited in scope and number than the aforementioned O3b authorizations. Furthermore, RigNet holds multiple licenses for comparable offshore earth station terminal and VSAT network operations in the C-band and Ku-band<sup>7</sup> and grant of the requested authority is consistent with RigNet’s ongoing commercial operations. Finally, the Commission has previously granted authorization to RigNet for fixed terminal operations in the Gulf of Mexico<sup>8</sup> and the herein proposed operations will be similar in nature. Grant of the requested authority will allow RigNet to enhance the commercial offerings on the Shenzi Platform and enable more efficient provision of critical communications services for employees and personnel on the platform using innovative terminal technologies, while also expanding the use of Ka-band satellite spectrum.

RigNet seeks to operate the Orbit-2.2 on a fixed oil platform while communicating with the O3b Ka-band NGSO FSS system.<sup>9</sup> For the relevant Ka-band

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<sup>5</sup> See SES-MS-20150206-00066, Letter from Jose Albuquerque, Chief, Satellite Division and Mark Settle, Chief, Policy and Rules Division, to Suzanne Malloy, O3b Limited, DA 15-601 (rel. May 20, 2015).

<sup>6</sup> See File No. SES-LIC-20141001-00781 (Call Sign E140101).

<sup>7</sup> See, e.g., RigNet Satcom, Inc., File No. SES-LIC-20070827-01132 (Call Sign E070189) & File No. SES-MOD-20100409-00427 (Call Sign E060317).

<sup>8</sup> See RigNet Satcom, Inc., File No. SES-LIC-20070827-01132 (Call Sign E070189).

<sup>9</sup> The Orbit 2.2 terminal has been more recently referred to as the OceanTRx™ 7-500 2.2m Ka-band stabilized maritime VSAT System. A commercial data sheet is available at the following link: <http://www.o3bnetworks.com/wp-content/uploads/2015/02/O3b-Maritime-2.2m-Orbit-DatasheetT-TRx-7-500.pdf> (visited Jan. 5, 2015).

frequencies, Comsearch conducted frequency coordination analyses that demonstrate RigNet may operate the Orbit-2.2 terminal without causing harmful interference.<sup>10</sup> Comsearch sent a coordination notice to existing licensees within relevant coordination distances and RigNet's proposed operations on the Shenzi platform are fully compatible with other FCC-licensed operations in these frequencies and present no potential for interference into other users of the subject Ka-band frequencies. RigNet also provides the attached Form 312, Schedule B, Technical Appendix and associated exhibits for relevant information relating to the Orbit-2.2 Ka-band terminal's operational characteristics.

## **II. SPECTRUM USE**

The United States Table of Allocations and the Commission's Ka-band Plan identifies various spectrum allocations for services in the Ka-band . RigNet will operate the Orbit-2.2 terminal in accordance with the Commission's Ka-band rules and policies or, to the extent necessary, seeks a limited waiver of the Commission's rules to operate the terminal on a non-conforming (unprotected and non-interference) basis.

RigNet seeks to communicate with O3b's Ka-band NGSO FSS system in the following bands: 27.6-28.4 GHz (Earth-to-space), 28.6-29.1 GHz (Earth-to-space), 17.8-18.6 GHz (space-to-Earth) and 18.8-19.3 GHz (space-to-Earth). The Orbit-2.2 terminal will be mounted on a single oil platform and, although the pointing angle of the antennas will change as O3b's satellites are tracked, the platform will remain stationary. In the following sections, RigNet demonstrates that it can operate the stationary Orbit-2.2 terminal consistent with the Commission's Ka-band spectrum policies.

O3b has previously completed all necessary coordination with U.S. government satellite networks operating in the Ka-band, including GSO and NGSO networks. O3b has also completed coordination with the U.S. government under footnote US334 of the FCC Table of Frequency Allocations. RigNet certifies that its proposed operations will be in accordance with all existing and future coordination agreements between O3b and other authorized Ka-band spectrum users.

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<sup>10</sup> See Technical Appendix, VI.

## **A. Uplink Frequencies & Ka-band Plan Designation**

### ***a. Primary NGSO FSS Uplink***

The Table of Frequency Allocations and the Commission's Ka-band Plan provide that the 28.6-29.1 GHz (Earth-to-space) band segment may be used by NGSO FSS systems on a primary basis and by GSO FSS systems on a secondary basis.<sup>11</sup> Accordingly, RigNet will operate the Orbit-2.2 terminal on a primary basis in the 28.6-29.1 GHz band in accordance with the Table of Allocations and Ka-band Plan.

### ***b. Secondary NGSO FSS Uplink***

The Commission's Table of Allocations and Ka-band Plan provide that in the 27.6-28.35 GHz (Earth-to-space) band, LMDS systems are primary and FSS systems are secondary.<sup>12</sup> Furthermore, in the 28.35-28.4 GHz (Earth-to-space) band segment, GSO FSS systems are primary and NGSO FSS systems are secondary.<sup>13</sup> Accordingly, RigNet will operate the Orbit-2.2 on a secondary, non-harmful interference basis to LMDS in the 27.6-28.35 GHz band and to GSO FSS systems in the 28.35-28.4 GHz band.

RigNet notes that its proposed operations in the 27.6-28.35 GHz band segment are consistent with the Commission's view on the type of FSS operations that would not cause harmful interference to primary LMDS stations in the band. The Commission has previously stated that FSS operations in this bands are limited to "gateway-type" operations. However, the Commission's references to "gateway-type" service in the 27.5-28.35 GHz band are not intended as a requirement that all earth stations in the band serve as gateway earth stations. Rather, the mention of "gateway-type" service in the

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<sup>11</sup> *In the Matter of Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, 11 FCC Rcd. 19005, ¶¶ 57-58 and 78 (1996) ("Ka-band Plan R&O"). See also *In the Matter of Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, 15 FCC Rcd 13430, ¶¶ 28 and 34 (2000) ("Redesignation of Ka-band Plan R&O").

<sup>12</sup> See *Ka-band Plan R&O* ¶¶ 59-62; see also *Redesignation of Ka-band R&O* ¶ 28.

<sup>13</sup> *Ka-band Plan R&O* ¶ 42; see also *Redesignation of Ka-band Plan R&O* ¶ 28.

27.5-28.35 GHz band serves as an example of what the Commission's envisions as the type of service that FSS operators would be able to provide on a secondary basis without causing interference to primary LMDS stations in the band.

The Commission's main concern is ubiquitous terminals that could interfere with LMDS operations, recognizing that "as a practical matter, it is unlikely that FSS can operate ubiquitous terminals on an unprotected non-interference basis to LMDS."<sup>14</sup> Although the rules limit operations in some bands to gateway earth stations only, the 27.5-28.35 GHz band is not among them and there is no requirement that earth station terminals serve as gateways.<sup>15</sup> RigNet's proposed earth station operations, at a single enterprise location -- an oil production facility -- in the Gulf of Mexico, are limited in scope and consistent with the Commission's views on high data-rate, gateway-type operations. Accordingly, RigNet can be permitted to operate on a secondary basis to LMDS in the 27.6-28.35 GHz band.

As a secondary user, RigNet's proposed operations in the 27.6-28.35 GHz band must not cause interference to primary LMDS stations. The attached Comsearch coordination report demonstrates that RigNet may operate the Orbit-2.2 earth station terminal on the Shenzi Platform without causing harmful interference to LMDS licensees. Comsearch sent a coordination notice to all existing licensees in the band within application coordination distances and no objections were received from incumbent licensees. Furthermore, RigNet agrees not to cause harmful interference to future primary LMDS operations in the band and will accommodate any future LMDS licensees to the extent necessary to avoid harmful interference.

In the 28.35-28.4 GHz band, RigNet will operate the Orbit-2.2 terminal on a secondary basis to GSO FSS systems and will not cause harmful interference to U.S.-

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<sup>14</sup> *In the Matter of Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5- 29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, Third Report and Order*, 12 FCC Rcd 22310, 22327, ¶ 42 (1997).

<sup>15</sup> The Commission has previously recognized that Ka-band maritime earth station operations are consistent with the Commission's view of "gateway-type" services and operations. *See* File No. SES-MSC-20150206-00066.

licensed GSO FSS systems in this band segment. Although Orbit-2.2 terminal will operate exclusively with O3b's NGSO FSS system, RigNet will operate the terminal consistent with the off-axis EIRP limits specified in Section 25.138 of the Commission's rules to ensure compatibility with GSO FSS Ka-band satellite operations.<sup>16</sup> Furthermore, as discussed in the attached Technical Appendix, the Orbit-2.2 terminal is designed to meet certain FCC ESV operational requirements, including: (i) pointing accuracy of 0.2° or better; (ii) automatic cessation of emissions within 100 ms if pointing offset exceeds 0.5°; and (iii) transmissions will not resume until pointing accuracy is within 0.2°.<sup>17</sup>

Finally, as previously demonstrated by O3b, operations of the subject Ka-band NGSO system comply with the relevant equivalent power flux density ("EPFD") uplink limits in the 27.6-28.4 GHz band pursuant to Article 22 of the ITU Radio Regulations.<sup>18</sup> Thus, the proposed NGSO terminal operations will provide the required level of protection from GSO FSS systems operating in the 27.6-28.4 GHz band.

## **B. Downlink Frequencies & Ka-band Designation**

### ***a. Primary NGSO FSS Downlink***

The Table of Frequency Allocations and the Commission's Ka-band Plan provide that the 18.8-19.3 GHz (space-to-Earth) band may be used by NGSO FSS operations on a primary basis.<sup>19</sup> Furthermore, as previously demonstrated by O3b, operations of the

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<sup>16</sup> See 47 C.F.R. § 25.138; Technical Appendix, I.

<sup>17</sup> See Technical Appendix, V.

<sup>18</sup> See File No. SES-MS-20150206-00066, Technical Appendix A.7; *contactMEO Communications, LLC*, 21 FCC Rcd 4035, 4043-4044 (IB 2006) (where the Commission held that compliance with the ITU's EPFD limits provides a sufficient basis for an NGSO FSS system to operate on a non-interference basis in a band in which GSO FSS systems are primary).

<sup>19</sup> See *Ka-band Plan R&O* ¶¶ 59-62; see also *Redesignation of Ka-band R&O* ¶ 28. Note that low power point-to-multipoint terrestrial fixed systems may continue to be licensed and operate on a co-primary basis with NGSO/FSS in the 18.82-18.87 GHz and 19.16-19.21 GHz bands.

subject Ka-band NGSO system comply with the relevant power flux density (“PFD”) downlink limits for the 18.8-19.3 GHz band designed to protect terrestrial FS services.<sup>20</sup>

***b. Downlink with No NGSO FSS Allocation***

The Table of Frequency Allocations and the Commission’s Ka-band Plan provide that the 17.8-18.3 GHz band may be used by FS systems on a primary basis and NGSO FSS operations on a non-conforming basis.<sup>21</sup> Furthermore, the Table of Allocations and Ka-band Plan provide that in the 18.3-18.6 GHz band, GSO FSS systems are primary with no allocation for NGSO FSS systems.<sup>22</sup> Accordingly, RigNet will operate the Orbit-2.2 on a non-conforming, non-interference basis to FS systems in the 17.8-18.3 GHz band and to GSO FSS systems in the 18.3-18.6 GHz band.

RigNet respectfully requests a waiver of the U.S. Table of Frequency Allocations, 47 C.F.R. § 2.106, and the Ka-band Plan to the extent necessary to permit its non-conforming use of the 17.8-18.6 GHz band. In considering requests for non-conforming uses, the Commission has indicated it would grant such waivers when there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the non-conforming operator accepts any interference from authorized services.<sup>23</sup>

RigNet certifies it will not claim protection from conforming uses of the spectrum while the terminal is operating and agrees to accept any harmful interference from other services while operating on an unprotected, non-conforming basis. In addition, RigNet will immediately terminate its earth station operations upon notification that such

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<sup>20</sup> See File No. SES-LIC-20130528-00455, Technical Appendix, A.5-A.7. Fixed Service stations in the United States operating in the 18.8-19.3 GHz band are no longer co-primary with FSS users in this band. See 47 C.F.R. § 101.85(b)(2).

<sup>21</sup> See *Redesignation of Ka-band Plan R&O* ¶¶ 28 and 34.

<sup>22</sup> *Id.*

<sup>23</sup> See Letter from Jose Albuquerque, Chief, Satellite Division and Mark Settle, Chief, Policy and Rules Division, to Suzanne Malloy, O3b Limited, DA 14-1369 (rel. September 22, 2014); *Contactmeo Communications, LLC*, Order and Authorization, 21 FCC Rcd 4035, 4044 (IB 2006); *ViaSat AMSS Order*, File No. SES-MFS-20090624-00789; see also 47 C.F.R. § 1.3.

operations are not permitted under the terms of a coordination agreement with, or are causing harmful interference to, any lawfully operating radio system in the 17.8-18.6 GHz band in conformance with the U.S. Table of Frequency Allocations. RigNet also certifies that its operations will be in accordance with any coordination agreement that has been or will be reached between O3b and other lawfully operating spectrum users.

As previously demonstrated by O3b, operations of the subject Ka-band NGSO system comply with the relevant downlink PFD limit for the 17.8-18.6 GHz band designed to protect terrestrial FS services.<sup>24</sup> Operations of the subject Ka-band NGSO system also comply with EPFD downlink limits in the 17.8-18.6 GHz band,<sup>25</sup> therefore providing the required level of protection from GSO FSS systems operating in the band pursuant to Article 22 of the ITU Radio Regulations. Furthermore, the terminal will operate within the off-axis EIRP limits specified in Section 25.138 of the Commission's rules and the pointing accuracy, recording and automatic muting capabilities of the Orbit-2.2 will ensure that there is no harmful interference to GSO FSS systems in this band.

### **III. PUBLIC INTEREST**

Grant of the requested earth station operating authority will strongly serve the public interest. As described in the application materials, the Orbit-2.2 will comply with the Commission's rules and policies governing Ka-band earth station operations and will otherwise operate on an unprotected non-interference, non-conforming basis. Authorizing the Orbit-2.2 terminal for Ka-band operations will also facilitate the utilization of Ka-band spectrum for more regularized commercial operations. In addition, RigNet will be able to provide more robust broadband satellite communications services to employees on the Shenzi Platform and enhance the commercial offerings in remote locations. Users will be able to utilize high-speed Internet access, corporate VPN, e-mail, voice and other services, including emergency communications to support oilrig personnel. Moreover, the Orbit-2.2 terminal will facilitate operational flexibility and service optimization based on spectrum availability and customer needs.

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<sup>24</sup> See File No. SES-MSC-20150206-00066, Technical Appendix A.5.

<sup>25</sup> *Id.* at Technical Appendix A.7.

#### IV. WAIVER

RigNet is seeking a waiver of the U.S. Table of Frequency Allocations, Section 2.106 of the Commission's Rules, 47 C.F.R. § 2.106, and the Commission's Ka-band plan to the extent necessary to permit its non-conforming use of the Ka-band as described above. As noted, in considering requests for non-conforming uses, the Commission has indicated it would grant such waivers when there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the non-conforming operator accepts any interference from authorized services.<sup>26</sup>

There is strong Commission precedent for granting such a waiver. The Commission has granted identical waiver requests to O3b on numerous occasions for its non-conforming use of the Ka-band maritime ESV operations.<sup>27</sup> The O3b waivers were granted in the context of NGSO maritime vessel operations and O3b has been granted authorization to operate on an unprotected non-interference basis in primary, secondary and non-conforming NGSO FSS spectrum. RigNet's proposed operations are much more limited and substantially conform to the Table of Allocations and Commission's Ka-band Plan. Additionally, RigNet has demonstrated it can operate the terminal on an unprotected non-conforming basis without causing harmful interference to other legally operating systems in the 17.8-18.6 GHz band.

As detailed in the above sections, when operating on an unprotected non-conforming, non-interference basis in the 17.8-18.6 GHz band, RigNet will not claim protection from conforming uses of the spectrum. In addition, RigNet will operate the terminal within the off-axis EIRP limits in Section 25.138 and otherwise comply with the Commission's two-degree spacing policy. Upon notification that such operations are not permitted under the terms of a coordination agreement with, or are causing harmful interference to, any lawfully operating system in the subject Ka-band segments in conformance with the U.S. Table of Frequency Allocations, RigNet will immediately cease transmissions. Accordingly, the Commission may grant the requested waiver.

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<sup>26</sup> See *supra* note 24.

<sup>27</sup> See Letter, DA 14-637 (rel. May 13, 2014); Letter, DA 14-1369 (rel. September 22, 2014); Letter, DA 15-601 (rel. May 20, 2015).

## **V. CONCLUSION**

In view of the foregoing, RigNet respectfully requests that the Commission grant it a license to operate the Orbit-2.2 fixed earth station terminal on the Shenzi Platform in the Gulf of Mexico in the Ka-band to communicate with O3b's NGSO FSS system.